

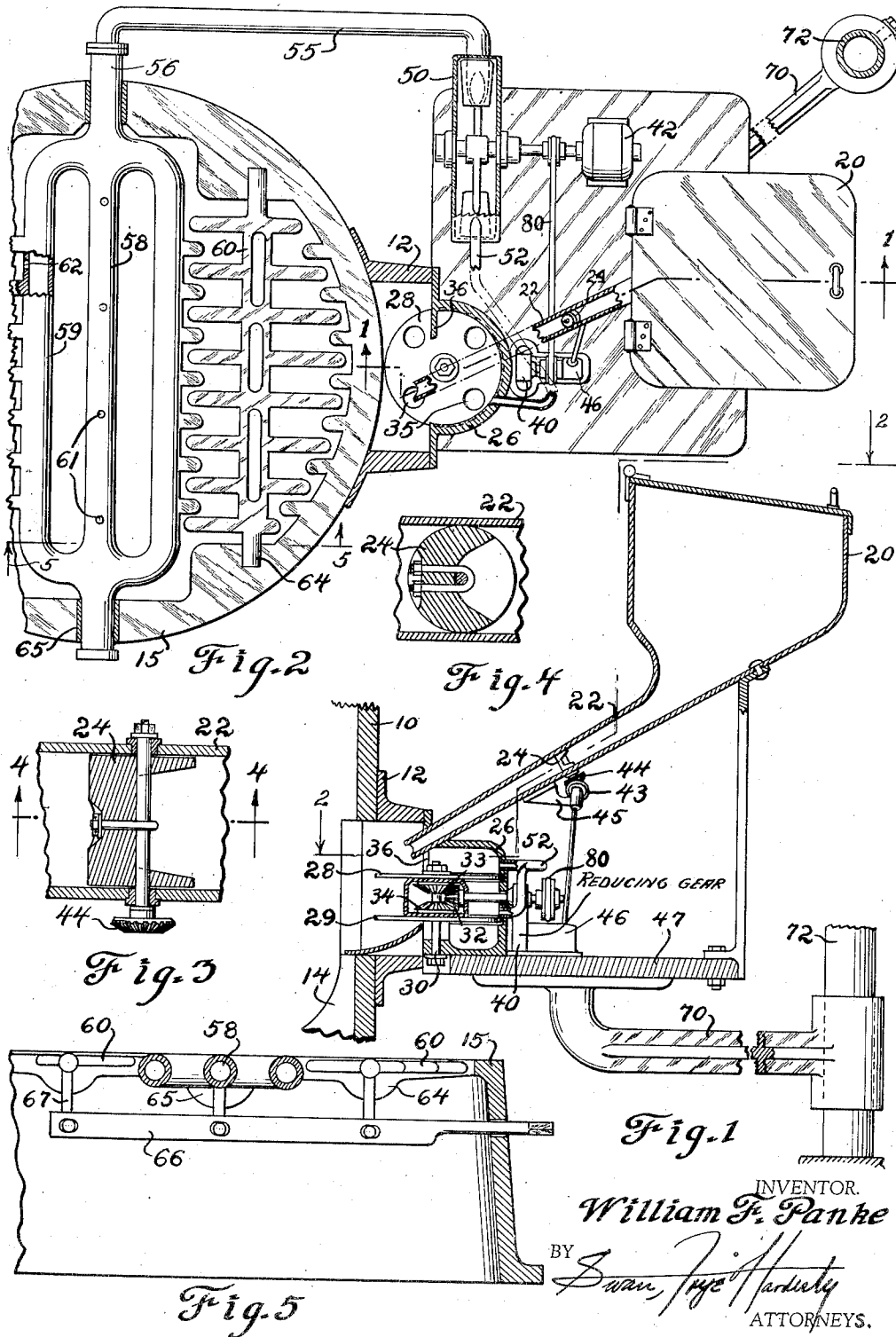
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APPARATUS FOR FEEDING AND BURNING FUEL

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APPARATUS FOR FEEDING AND BURNING
FUEL

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6 Claims. (Cl. 110—104)

This invention relates to fuel-feeding and burning means, and aims particularly to provide improved apparatus whereby slack and other low grade coal, consisting largely or entirely of dust, may be completely and efficiently burned in furnaces and the like of small size, with the use of apparatus of extremely simple nature and which requires a minimum of service and attention.

Another important object is to provide fuel and air feeding and burning means readily adaptable to household furnaces already installed, incorporating grates and forced draft means so arranged that although a fuel bed may be maintained upon the grates, a large proportion of the fuel combustion takes place in the air.

A further object is to provide an improved sprinkler type stoker having a plurality of throwing elements rotating in horizontal planes in opposite directions and so arranged that each feeds a portion of the fuel, which is thereby evenly distributed in all directions within the firebox, and in which the fuel-feeding means and forced air draft may be operated by the same source of power.

Still another object is to provide improved means for assisting by air pressure the mechanical fuel-feeding action of the rotary sprinklers.

A still further object is to provide such fuel-feeding apparatus incorporating in addition to the advantages mentioned such compactness as to enable mounting the same as a unitary assembly at and swingable with the door of a furnace, in such fashion that the fuel may be fed through the door, the construction of the furnace itself being virtually unaffected by and independent of the application of my improvement thereto.

Still another object is to incorporate in such apparatus an improved hollow blast grate construction.

Other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawing illustrating preferred embodiments of my invention, and wherein similar reference numerals designate similar parts throughout the several views.

In the drawing:

Figure 1 is a vertical sectional elevation taken substantially centrally and on line 1—1 of Figure 2 through the fuel feeding portions of stoking apparatus incorporating the principles of this invention.

Figure 2 is a horizontal section taken substantially on the line 2—2 of Figure 1 and looking in the direction of the arrows.

Figures 3 and 4 are, respectively, diametrical and transverse sectional details of the fuel feeding control gate, Figure 4 being taken substantially on the line 4—4 of Figure 3, and looking in the direction of the arrows.

Figure 5 is a vertical section through the grate, taken as indicated by line 5—5 of Figure 2.

Referring now to the drawing, reference character 10 designates a furnace, shown illustratively and somewhat diagrammatically as of the hot air variety commonly used in houses. It will be recognized, however, that the details of construction of the furnace are not vital to the invention and may vary considerably. They will accordingly not be particularly dealt with other than to indicate the provision of such necessary conventional portions as the fire door 12, the firepot 14, and the grate-supporting portion 15. The fire door is shown as located at the top of the firepot, spaced above the grates, in a common position. The stoking apparatus includes a gravity feed fuel hopper 20 having a feed tunnel 22 in which is mounted the rotatable feeding gate 24 which meters the flow of coal or other fuel through the feed tunnel. The feed tunnel terminates in the upper portion of the housing formed by the box-like special door 26, directly above the upper fuel sprinkler disc 28, beneath and spaced from which is mounted another disc 29, shown as of similar size and arranged to rotate in the opposite direction. The discs, which are freely rotatable on a vertical spindle 30 carried in housing 26, are driven by a common miter pinion 32 driving miter gears 33—34, one connected to each disc. As best shown in Figure 2, the upper sprinkler disc 28 is pierced as at 35 with a plurality of holes through which a portion of the coal fed onto the same may pass to the lower disc to be thereby thrown into the firebox. A fixed scraper 36 carried by the housing tends to wipe coal off disc 28 and force it to fall through the holes 35 onto the lower disc. The discs are driven through speed reducing gearing, as 40, by an electric motor 42, which is connected thereto by a belt 80, and the feed gate 24 is driven by the same gearing at proportionate speed, through the additional gear train 43—44, the drive gearing for the gate being carried on suitable supports, as 45, 46 mounted upon the feed tunnel and on table 47, which is shown as carrying the entire assembly of fuel-feeding apparatus and motor thus far described.

Also mounted upon the table is a blower 50 which delivers air to the housing 26 through air

tube 52, which is branched to discharge it at two points, one above each disc, and in such direction as to blow the air over the discs and toward the firebox, and so assist the projection of the fuel.

The blower also delivers air, through tube 55, to the air supply coupling 56 of a hollow blast center grate section generally designated 58. The grate assembly, which is best shown in Figures 2 and 5, includes outer sections 60 of generally conventional form between which is mounted the hollow section 58, formed of tubing branched to provide the desired gap and grate area and provided, at least in the central branch, as shown, with air jet openings 61, and preferably also in its side tubes, as 59, with additional air jet openings as 62 directed laterally toward the solid grates 60, so that air may also be blown thereover and rise therethrough due to the draft, and the blast effect is distributed over an area wider than the central section 58. The solid grate sections 60 are shown as rotatable in trunnion bearings 64, while the hollow grate section 58 is also trunnioned for rocking movement in bearings 65, coupling 56 being of swivel character to permit such rocking. A shaker bar 66 may be provided, suitably connected to the grates as by shaker arms 67 to enable rocking all of the grates simultaneously to shake the fire.

The entire table 47 and the elements supported thereby is mounted on a bracket, as 70, swingably carried by a post as 72 allowing swinging of the apparatus away from the door 12 when desired.

Preferably powdered fuel, such as low grade slack coal, is burned in my improved fuel-burning apparatus, for the sake of economy, and it has been found that by properly proportioning the air blast between the grate section and the disc section, which is a matter of simple adjustment and not at all critical, however, the greater portion of the powdered coal may be burned in the air above the grates, with resultant complete combustion. The size and rate of rotation of the fuel metering gate 24 are of course so proportioned as to supply the proper quantity of fuel, and the proper rate of fuel feeding is maintained throughout whatever speed variances may take place in the operation of the remaining apparatus, since the gate and stoking means are driven from the same motor.

What I claim is:

1. Means for feeding and burning fuel, including a source of air under pressure, means for supplying the fuel, a throwing element to which the fuel is delivered by the supplying means, means for rotating the throwing element to project the fuel toward a desired zone of combustion, and air jet means directed upon the throwing means for blowing air from said source across the throwing element in the direction of projection of the fuel to assist such projection and the combustion of the fuel and to assist in clearing the throwing element.

2. Means for feeding and burning fuel, including means for supplying the fuel, a throwing element rotatable in a horizontal plane and on top of which the fuel is delivered by the supplying means, another throwing element at least partly

underlying the first, means for rotating said second throwing element in another direction, and means for transferring a portion of the fuel from the first throwing element to the second, whereby the fuel may be thrown at diverse angles thereby toward a desired zone of combustion.

3. Means for feeding and burning fuel, including means for supplying the fuel, a throwing element rotatable in a horizontal plane to which the fuel is delivered by the supplying means, another throwing element at least partly underlying the first, means for rotating said second throwing element in another direction, means for transferring a portion of the fuel from the first throwing element to the second, whereby fuel may be thrown at diverse angles thereby toward a desired zone of combustion, and means for blowing air over both of said elements in the general direction of said zone of combustion.

4. Means for feeding and burning fuel, including means for supplying fuel, a throwing element rotatable in a horizontal plane and on top of which the fuel is delivered by the supplying means, another throwing element at least partly underlying the first, means for rotating said second throwing element in the opposite direction and also in a horizontal plane, means for transferring a portion of the fuel from the first throwing element to the second, whereby the fuel may be thrown at diverse angles thereby toward a desired zone of combustion, and means for blowing air over both of said elements toward said zone of combustion.

5. Fuel burning apparatus including a furnace having a grate, air blast means for directing a flow of air upward through a fire bed on the grate, a pair of sprinkler disc elements arranged one above the other and mounted for rotation about a vertical axis at one side of the grate, one of said discs having an aperture therethrough, means for driving said discs at a fixed relative speed, means for delivering finely divided fuel to and depositing it upon the upper disc, means enclosing said discs except at a peripheral area at which it is desired that fuel be discharged, and means for causing a portion of the fuel delivered to the upper disc to fall through said aperture onto the lower disc.

6. A fuel burning and stoking construction including in combination with a furnace having a grate, means including a plurality of throwing discs rotatable in horizontal planes and one overlying another, for throwing fuel into the region directly above the grate, fuel holding and feeding means, said feeding means discharging upon an upper one of said discs, means for rotating the discs in opposite directions, whereby they tend to throw fuel therefrom in different directions, means enclosing said discs except at a peripheral area from which fuel is desired to be thrown, means for transferring fuel from an upper to a lower disc, means responsive to the rate of rotation of the discs for regulating the fuel flow, means for discharging air over the discs and toward said region directly above the grate, the air delivery being also proportional to the rate of rotation of said discs.

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